



JANUARY, 1987

EDITORIAL

In this issue of the newsletter you will find a list of the papers that will be presented at the upcoming 1987 B.C. Soil Science Workshop. The workshop, titled "Organic Soils and Horizons" will be held February 19 and 20th at U.B.C. Our Society's Annual General Meeting and wine and cheese will be held at the same time, so plan to attend. Also in this issue, Gerry Still describes the objectives of the B.C.F.S. Forest Site Degradation and Rehabilitation Committee. We thank him for his submission, and also thank our conference reviewers. As always, all potential contributors to the newsletter are urged to do so. The next copy of the newsletter is scheduled for the spring. Please pay your \$5.00 membership fee for 1987.

Best wishes for 1987. Bill Price, Mike Curran

IN MEMORIUM:

We regret to announce that Laurie Farstad, an Honorary Member of the Pacific Regional Society of Soil Science, died of a heart attack on January 8, 1987, at the age of 76. Laurie obtained his academic degrees at the University of Saskatchewan and U.B.C. From 1939 to 1975 he was head of the the Soil Survey Branch of Agriculture Canada in Vancouver. He also served as a soils consultant, both in Canada and overseas. Laurie made a lasting contribution to soil science in British Columbia.

ANNUAL GENERAL MEETING

This year's AGM will again be held in conjunction with the B.C. Soil Science Workshop. It will immediately follow the first day session of the Workshop, in Room 104 of the Henry Angus Bldg, 4:15 - 5:15 pm. Expect the usual refreshments.

The following 1987 executive has been nominated by the Nominating Committee (Carol Jones and Dave Spittlehouse)

Past President: Carol Jones
President: Dan Lousier
Vice President: Mike Goldstein
Treasurer: John Jungen
Secretary: Shannon Berch

Further nominations will be welcomed from the floor at the AGM.

ORGANIC SOILS AND HORIZONS

**1987 British Columbia Soil Science Workshop
February 19 and 20**

Location: Rm 104, Henry Angus Bldg.
University of British Columbia

Programme

Thursday, February 19

08:00-08:45 Registration

08:45-08:50 Opening Remarks
J. de Vries, Workshop coordinator

**Morning Introduction - L.M. Lavkulich (Department of Soil Science,
University of British Columbia), Chairman**

08:50-09:30 "Organic soils: revised capability for agriculture"
- S.P. Mathur (Agriculture Canada, Ottawa)

09:30-10:10 "Chemical characterization of organic soils and horizons"
- L.E. Lowe (Department of Soil Science, University of British
Columbia)

10:10-10:40 Coffee

10:40-11:20 "Physical and hydrologic characterization of organic soils and
horizons"
- J. de Vries (Department of Soil Science, University of British
Columbia)

11:20-12:00 "Biochemical oxidation"
- S.P. Mathur (Agriculture Canada, Ottawa).

**Afternoon Organic Soils - R.A. Bertrand (British Columbia Ministry of
Agriculture and Forestry, Cloverdale, B.C.), Chairman**

13:30-14:00 "Cariboo wetlands: a hydrologic model controlling wetland
formation"
- C. Selby (Agriculture Canada, Vancouver).

14:00-14:30 "Forage production management on Interior meadows"
- A.L. van Rijswijk (Agriculture Canada, Kamloops, B.C.).

14:30-15:00 "An organic soil problem on a Lower Mainland Cranberry farm"
- A.J. Green (Agriculture Canada, Vancouver).

15:00-15:15 Coffee

15:15-15:45 "Water management of organic soils"
- M.G. Driehuyzen (British Columbia Ministry of Agriculture and
Food)

15:45-16:15 "The application of carbon 13 solid state nuclear magnetic resonance spectroscopy for characterization of organic soils and horizons" - C. Presfon (Pacific For. Res. Centre, Victoria, B.C.)

16:15-17:15 **General meeting, Pacific Regional Soil Science Society**

Friday, February 20

Morning - Organic horizons - T.M. Ballard (Department of Soil Science, University of British Columbia), Chairman

09:00-09:30 "Classification of forest humus forms"
- R.N. Green (British Columbia Ministry of Forests, Burnaby, B.C.)

09:30-10:00 "Classification of folisols"
- R. Trowbridge (British Columbia Ministry of Forests, Prince Rupert, B.C.)

10:00-10:30 Coffee

10:30-11:00 "Significance of mulls, moders and mors"
- K. Klinka (University of British Columbia Forestry Faculty)

11:00-11:30 "Role of forest floors in soil temperature and moisture regimes: implications for tree seedling establishment"
- T.A. Black (Department of Soil Science, University of British Columbia)

11:30-12:00 "Modification of the forest floor"
- G.F. Weetman (University of British Columbia Forestry Faculty).

Afternoon

Field trip to the shallow organic soils of the Nicomekl-Serpentine area. (optional).

FOREST SITE DEGRADATION AND REHABILITATION COMMITTEE

In May of 1985 the B.C. Ministry of Forests initiated the formation of a working committee to address issues related to forest site degradation and rehabilitation. I have the honour of acting as chairman of this committee. The intent of this letter is to formally introduce the committee and inform you of our terms of reference and general concerns.

The formation of this committee came about as a result of a number of factors. First and foremost, current research information originating in the Pacific Northwest United States indicates that there is a very real potential for site degradation and adverse site productivity effects as a result of some forest management impacts. These effects and impacts appear to be a function of, primarily, the extent and nature of soil disturbance caused by forest operations. This information suggests that we in B.C. are probably incurring similar adverse effects, stemming from our forest harvesting practices and the attendant soil disturbance. However, we do not, as yet have an adequate understanding of the full scope of the problem in this province. It is of some consequence that, with time, progressively more forest harvesting is occurring on more sensitive sites (e.g., steep slopes, high elevation, etc.). All of this information has, amongst other things, stimulated a demand for provincial site/soil disturbance regulations pertaining to forest management operations. In response, the B.C. Ministry of Forests initiated the formation of the above mentioned working committee because it felt there was a need for a coordinated, comprehensive approach to understanding fully the nature and extent of site/soil degradation problems, the costs to the province of these problems, and the preventive and remedial measures required.

More specifically, the terms of reference of the committee are:

1. to increase the level of awareness within the forestry community in regard to site/soil degradation effects of forestry activities;
2. to promote the maintenance, improvement or rehabilitation of site productivity in forest and range land management, and
3. to serve as the lead committee to coordinate related internal (B.C. Ministry of Forests) activities.

The objectives of the committee are as follows:

1. to identify the nature and magnitude of the site degradation problem - economic costs; soil loss; loss of forest productivity; effects on other resources and other resource users;
2. to summarize the current research information, current technological and methodological information, and the state-of-the-art rehabilitation measures; to identify additional research needs;
3. to recommend research priorities and other activities; to coordinate B.C. Ministry of Forests site degradation and rehabilitation research;
4. to promote the dissemination of research results to other researchers and to operations personnel; to encourage and assist in the implementation of the research results; and
5. to act as a contact/advisory group for the B.C. Ministry of Forests and other agencies.

The committee also formulated a proposed plan of action which it accomplished in part during the 1985 calendar year. In 1986, and in future years, this

committee will strive to carry on with that work plan, and will continue to promote and facilitate appropriate soil and related resource management in B.C.

Would you please be good enough to notify other relevant members in your organization of our committee's concerns and commitments? We welcome any input you or your members might have, and would encourage you to contact us with requests for information, or to pass on information or suggestions that you think might be relevant to our concerns.

Thank you.

Gerry Still, Chairman
Forest Site Degradation and
Rehabilitation Committee

International Soil Science Society Meeting, held at Hamburg, West Germany, 1986

Summary by: Lawrence Lowe

I was fortunate enough to be able to attend the International Soils Conference last August, along with at least 58 other Canadians - an impressively strong representation. Among these were several 'locals' including Dave Moon, Hans Schreier, Gerry Nielsen and Al Van Ryswyk. I met a lot of old friends and some new ones. Some of you may remember Aulis Ritari from Finland, who studied forest soils at UBC. I can report that he is thriving and sends his best wishes to those he knew in Vancouver.

The conference programme was a full one, but suffered from the usual problem of having 5-6 concurrent sessions, which can be frustrating if you want to hear papers presented in difference commissions at the same time. Based on my particular sampling of the total offering of oral papers, I felt there was more 'new material' than usual at such gatherings. There were some excellent review papers and some good symposia, bringing together people from different disciplines. There were also a large number of posters presented, offering the opportunity to have discussions with soil scientists from many countries and on all sorts of topics. I was quartered in the same hotel as most of the Australian contingent, together with some Danish scientists. Altogether a very stimulating experience. In addition to the conference, I went on a postconference soils tour to examine soils of the Swiss and Austrian Alps. This was definitely the high point of the summer.

With regard to impressions of soil science in Europe as a whole, the two features that struck me most were 1) much less reluctance to cross disciplinary boundaries than here, and 2) the strong emphasis on environmental problems related to soil and water.

Remote Sensing for Resources Development and Environmental Management: 7th International Symposium of Commission VII.

International Society of Photogrammetry and Remote Sensing, held at International Institute for Aerospace Survey and Earth Sciences (ITC), Enschede, Netherlands, August 25-27, 1986.

Summary by: Hans Schreier

I was able to identify four major changes which are taking place in Remote Sensing Research: 1. Emphasis towards better integration of Remote

Sensing Data with available survey information, and 2. Less emphasis on satellite image analysis, 3. Considerable emphasis on basic ground-based spectral reflection research, and 4. A renewed interest in cheap digital analysis of aerial imagery.

There is increasing recognition that remote sensing information by itself is not sufficient to provide a basis for resource development and environmental monitoring. During the conference ample emphasis was given to the topic of integrating remote sensing information with other survey data. Geographic Information Systems (GIS) appears to facilitate this integration and the use of micro-computer based systems is most promising. The commercial exhibitors featured a large number of mini-computer based image analysis systems, but it is clear that the researchers and users are somewhat reluctant to purchase these systems. The reason for this is cost. Almost all of the systems are geared toward the use of geo-corrected digital satellite data (LANDSAT-D, SPOT), but the cost of the systems and particularly the cost of the satellite data are very serious drawbacks.

Many authors emphasized the need for cheaper and simpler methods of assessing remote sensing data and several papers were presented on the topic of digital analysis of aerial imagery. In spite of the availability of the highly publicized SPOT data (French Satellite data with 10m and 20m ground resolution) the trend is definitely towards cheaper imagery and image analysis systems.

Finally, it was pointed out by several authors that more basic research is needed in order to gain a better understanding of the interactions between spectral reflection and rock, vegetation and soil properties. The need for standardized reference materials was particularly emphasized.

PERSPECTIVES ON LAND MODELLING WORKSHOP: CANADA COMMITTEE ON ECOLOGICAL LAND CLASSIFICATION

Held in Toronto, November 17-20th, 1986

Summary by: Steve Smith

The workshop was attended by 70 participants, including a significant number from the USA.

The theme for the meeting focused on advances in land modelling concepts and applications in Canada and abroad. The following main topics were discussed; Concept/definition, Methodologies, Applications and Support Systems.

The program consisted primarily of papers presented during the three days in plenary sessions. In addition, a display area was set aside for posters illustrating modelling applications and Tydac Technologies Inc. demonstrated a new GIS, Spatial Analysis System (SPANS).

Four workshop/discussion groups were also convened during the meeting to look at priority issues requiring models and future strategic developments related to;

- Assessment of Project Impacts
- Natural Resource Management
- Land Use Planning
- Large Scale Issues Management

These working groups almost unanimously agreed that a great deal remained to be done in developing models which were simple and cost effective, and were relevant to the decision making process used by politicians and planners. Many modellers, it was felt, had not yet accurately defined the problem they were trying to answer and therefore could not define the data inputs necessary to develop a good model.

The problems associated with scale received a great deal of attention from the meeting after a stimulating and lively presentation from Dr. Tim Allen, University of Wisconsin. He pointed out that all too often problems arise when researchers try to move from one scale to another without realising the limitations of their models, and then wonder why they don't seem to work quite as well at the new scale!!

The meeting was the first of its kind to be organized in Canada. Enthusiasm was evident among participants and it is likely further meetings will be organized in the future. The workshop proceedings will be published in 1987.

**Canada Land Reclamation Association, 11th Annual Meeting, 'Land Rehabilitation: Policy, Planning Systems and Operational Programs'
University of British Columbia, June 3-6, 1986**

Summary by: Coleen Hackinen

The conference began with a look at land reclamation policy from the perspective of government and industry. Several papers were then presented which described operational programs and research involved in the rehabilitation of land disturbed by railway, hydroelectric dam, right-of-way and mining activity. Examples of reclamation in the area of urban development were also presented; specifically the ALRT experience and garbage disposal site rehabilitation. Additional topics included ameliorative techniques for degraded forest and agricultural soils and the use of native plant materials in reclamation.

**Alberta Land Reclamation Conference:
sponsored by Canadian Land Reclamation Association, Alberta Chapter
Hinton, Alberta, September 1986**

Summary by: Bill Price

The conference was attended by approximately 70 people, almost all of whom were from Alberta. The audience and speakers contained a good mix of researchers, regulators, industry personnel and consultants.

The first group of papers dealt with projects aimed at restoring wildlife habitat. Another set of papers illustrated the extensive reclamation programs being carried out at coal mines in the foothills. Work at present was shown to concentrate on the short term objective of establishing an agronomic cover for erosion control, forage production, and public relations. The session finished with a lively debate about how long the agronomic cover would sustain itself.

Two of the most interesting papers dealt with the disposal of oil drilling muds. The muds appear to have some undesirable characteristics but little appeared to be known of their variability or the extent seepage from disposal pit contaminates the groundwater. High cost has limited groundwater monitoring.

FOREST CLIMATE 86: SYMPOSIUM/WORKSHOP ON CLIMATE APPLICATIONS IN FOREST RENEWAL AND FOREST PRODUCTION

Orillia, Ontario, November 17-20, 1986

Summary by: David T. Price

Approximately 45 papers, covering a wide range of topics, were presented by meteorologists, forest researchers and practising foresters from all parts of Canada, as well as Sweden and the U.S. Early sessions broadly covered the importance of climate, and to a lesser extent soil conditions, on: forest renewal (including genetics, seed production and nursery practice); forest land capability classification; site preparation and silvicultural practices; factors affecting seedling survival after planting; stand development and wood quality; forest fire management; and atmospheric pollution. After these serious topics the content deteriorated into more dubious areas such as the economic value of climatological research, energy efficient housing, new technology and automation of climate data collection.

The opening address by Dr. K.L. Perttu explored the importance of climate in forestry using examples from his own extensive work on poplar cultivation in Sweden. The following evening, W. Young presented an entertaining appeal for forest research generally, as an important component of Canada's forest renewal program. One of the best papers was by L.A. Josza and J. Richards (from FORINTEK), who presented remarkably consistent examples of the effects of annual climate differences on Douglas-fir growth rings. The most thought-provoking paper was from D.F.W. Pollard of the C.F.S. in Ottawa, who reviewed the socio-economic implications of increasing atmospheric CO₂ concentration and the effects on the Canadian climate for agricultural and forest production. If model predictions are correct, the overall effects - longer, warmer growing seasons and increased water use efficiency due to CO₂ enrichment - could make Canada the most productive part of North America to inhabit in the late 21st century. By that time most of the southern and central U.S. will probably be desert. Furthermore, many of the larger population centres in Europe and the U.S. could be flooded, whereas very little of Canada will be affected. Now, if this could be worked into the free-trade negotiations...

Innovations in Agriculture: 39th Annual Meeting of the B.C. Institute of Agrologists, Victoria, April 5th, 1986

Summary by: Harvey W. Sasaki

The panel discussion was chaired by S.B. Peterson, P.Ag., former President, AIC and former Deputy Minister, B.C. Ministry of Agriculture and Food. Presentations were made by Dr. George Winter, Integral Economic Systems Ltd., who spoke on Computer Applications to Agriculture; Dean J.F. Richards, Faculty of Agricultural Sciences, U.B.C., who spoke on Education/Technology Transfer Programs in Agriculture; Mr. H.D. McRorie, Vice-President, Agricultural Services, Royal Bank of Canada, who spoke on Innovations in Farm Financial and Marketing Programs; and Dr. M. Weintraub, Director, Vancouver Research Station, Agriculture Canada, who spoke on the Application of Biotechnology in Agriculture.

All four speakers gave excellent presentations on timely topics falling under the theme of Innovations in Agriculture. If you wish to obtain copies

of the presentations in order to get more specific information for your newsletter, copies can be obtained from the:

Office of the Registrar
B.C. Institute of Agrologists
209 - 5752 - 176th Street
Surrey, British Columbia V3S 4C8

Age of Information: Agricultural Institute of Canada/Canadian Society of Soil Science: Annual Meeting, July, 1986, Saskatoon

Summary by: Art Bomke

1) Age of Information - Plenary Session

Comments by J.T. Bonnen, Ag. Econ. Mich St. Univ. Fifty percent of US work force is involved with information technology.

Information = data and interpretation. The value of information is in reducing the uncertainty in decision making. Productivity deferred is productivity lost.

C.M. "Red" Williams - Animal Sci. Univ. of Sask. Information is needed to convert comparative advantages into competitive advantages, since most products must compete in international markets.

(Geographic disadvantages of B.C. can be reduced by wise use of technology, for example the use of innovative communications techniques to supply extension services in remote areas.)

2) Potassium Symposium Ken Pretty, Potash and Phosphate Inst. talked about the potential potash market in China. He contrasted the development of fertilizer markets in Asia with North America and Europe. In the latter regions P and K fertilization increased first, followed by N. However, many developing countries have begun by using N, with P and K use lagging behind, much to the sorrow of the P.P.I.

R.J. Goos, Soil Sci. North Dakota St. Univ. discussed the reduction in root rot and tan spot by Cl fertilization of winter wheat. The mechanism appears to be related to a Cl reduction in tissue nitrate concentrations.

(This may be an argument for smaller annual applications of KCl rather than large infrequent build-up rates. Cl leaching would likely deplete these elements each winter in Coastal B.C. as shown in the Willamete Valley in Oregon). Stan Barber, Purdue, and Tony Glass, UBC Botany Dept., also spoke on K uptake and nutrition. To find out what they said you can read Barber's book and drop in at UBC and talk to Tony personally.

Lastly, the biggest benefit of attending meetings is making new contacts and renewing friendships. Among these are numerous B.C. refugees in Saskatchewan including UBC grad Mike Grevers. Mike is working on a Ph.D., teaching Voc. Ag. courses and coordinating the \$500,000/yr "Innovative Aires" program. This program is testing in cooperation with farmers new crop and soil management practice. Others are Clint Hilliard, Jay Frederick, Soil Survey; Nigel Livingston, Ag.Met., Eric Bremer, Grad Student, and Gary Bank and Dennis Haak, PFRA.

The Northwest Forest Soils Council Summer Meeting, held July 7-11, 1986 in interior Alaska.

Summary by: Tim Ballard

Ed Packee not only organized an outstanding soils tour, but also ensured that we had inexpensive accommodations, entertainment at the Malemute Saloon,

a banquet of reindeer stew and other delicacies, and a tour of an operating placer mine. The meeting was hosted by the University of Alaska, Fairbanks, with major contributions being made by US Forest Service personnel and U of A staff. On July 7, we visited the U of A Agricultural and Forestry Experiment Station. July 8 was spent looking at permafrost and its biological and engineering implications, including a tour of the US Army Corps of Engineers permafrost tunnel. On July 9, we toured sites illustrating implications of placer mining and fire in relation to soils and forestry; sites where various studies of regeneration, mechanical site preparation and nutrient cycling were being conducted; and the Bonanza Creek Experimental Forest. July 10 featured a boat tour along the Tanana River, stopping at Willow Island, where several well known studies of soils and forest succession have been carried out. The July 11 tour focussed principally on soils aspects of agricultural development, but also included a stop at an archeological site. While in the interior, many of us took the opportunity to visit Denali National Park and Mt. McKinley. The meeting was well attended and yielded good discussions in the field.

Northwest Fire Council Annual Meeting: "Prescribed Fire Management Issues"
Nov. 18-19, 1986, Olympia, Washington

Summary by: Mike Curran

Once the monsoons hit every fall, forest fire managers breathe a sigh of relief and huddle to assess current issues and the past fire season. This year about 150 attended, including a good number from Canada. Topics covered were: prescribed fire research, air quality & smoke management, fire season reports, liability insurance, and economics & implementation. Whereas Canadian research and operations are largely focused on prescribed fire effects at the site level, in Washington and Oregon off-site concerns have become the factors governing research direction and operational burning. Smoke management has become a major political issue, because of proximity to populated areas and back country aesthetics. The last two sessions would have benefitted from visual aides, but it was interesting to hear about these issues. The difficulties of economic forecasting make studying long-term effects look not too bad! Proceedings will be published.

Roots in Forest Soils: Biology & Symbioses
International Union of Forest Research Organizations' Working Party on Root Physiology and Symbioses (\$2.01-13), Aug. 4-8, 1986, University of Victoria, Victoria, B.C.

Summary by: Mike Curran

About 200 prominent (and not so prominent) scientists from all over the world convened to enjoy a good stretch of summer weather. Topics included: root physiology and form, root symbionts, and applications to reforestation. A large number of presentations on mycorrhizal research demonstrated the complex ecology and physiology of these symbionts. Other major subjects included measures of seedling root growth capacity and physiology in storage and planting environments. Some other papers and posters included: plant growth effects on soil aggregates, nitrogen fixing microbial complexes associated with the rhizosphere, and root excavation using explosives (possible application to soil pits?). One highlight was a field tour of the B.C.F.S. Cowichan Lake Research Station, including a swim and an incredible

banquet. The conference ended with an excellent panel of keynote speakers; a point was raised concerning the possible domination of these type of conferences with mycorrhizal research, to the possible exclusion of other fields. Proceedings will be published in a special issue of the Canadian Journal of Forest Research.

Some Upcoming Meetings

February 9-12, 1987. Society for Range Management Annual Meeting, Boise, Idaho. Contact H.F. Mayland, USDA-ARS, Route 1, Box 186, Kimberly, Idaho 83341.

February 17-18, 1987, 24th Alberta Soil Science Workshop, Calgary.

February 18, 1987. B.C. Chapter, Soil Conservation Society of America: SOIL CONSERVATION STRATEGIES FOR B.C. (Multiple Resource - e.g., Agric., Forestry, etc.). Followed by Annual Business Meeting and Refreshments. 7:30 pm, Room 158, MacMillan Building, 2357 Main Mall, UBC. Contact: Laurens van Vliet 224-4355.

February 19, 1987. Pacific Regional Society of Soil Science, Annual General Meeting. *4:15-5:15 pm, Room 104, Henry Angus Bldg., UBC. Refreshments.

*Note Time, this meeting immediately follows the first day session of the B.C. Soil Science Workshop.

February 19-20, 1987. B.C. Soil Science Workshop: "Organic Soils and Horizons" Room 104, Henry Angus Bldg., UBC. *See Description in this Newsletter

February 26-27, 1987. International Erosion Control Association 18th Annual Conference, Sparks, Nevada. Contact IECA, P.O. Box 195, Pinole, California 94564--0195.

April 8-10, 1987. B.C. Mine Land Reclamation Meetings. Campbell River, B.C. Contact: John Errington, B.C. Min. Energy, Mines and Pet. Resources, Victoria.

April 27-29, 1987. "Role of Legumes in Conservation Tillage". Nat. Conf. Athens, Georgia. Contact SCSA, 7515 N.E. Ankeny Road, Ankeny, Iowa, 50021.

May 29-June 3, 1988. 6th IWRA World Water Congress "Water for World Development", Ottawa Capital Congress Centre. Contact The Secretariat, 6th IWRA World Water Congress, University of Ottawa, 631 King Edward Avenue, Ottawa, Ontario K1N 6N5.

Summer 1987. Northwest Forest Soils Council Summer Meeting and Field Tour, Colville, Washington.

July 31-August 9, 1987. 12th Congress of the International Union for Quaternary Research, Ottawa, Ontario. Contact J.J. Clague, Program Committee, Geological Survey of Canada, 100 West Pender Street, Vancouver, British Columbia V6B 1R8.

August 2-5, 1987. Soil Conservation Society of America 42nd Annual Meeting. "Forces Shaping Resource Management", Billings, Montana. Contact D. Unger, SCSA, 7515 N.E. Ankeny Road, Ankeny, Iowa, 50021-9764.

August 16-19, 1987. The 33rd Annual Meeting of the Canadian Society of Soil Science, Ottawa, Ontario. Theme: Land Management in a Changing World.

August 24-27, 1987. Wetlands '87 -Canadian Wetlands Ecology and Conservation Symposium. This symposium, to be sponsored by the National Wetland Working Group of the Canada Committee on Ecological Land Classification, in Edmonton, Alberta

December 5-6, 1987. Workshop on Perspectives on the Contamination of Groundwater from Agriculture, New Orleans, Louisiana. Contact Soil Science Society of America, 677 South Segeo Road, Madison, Wisconsin 53711.